Midwest Engineer

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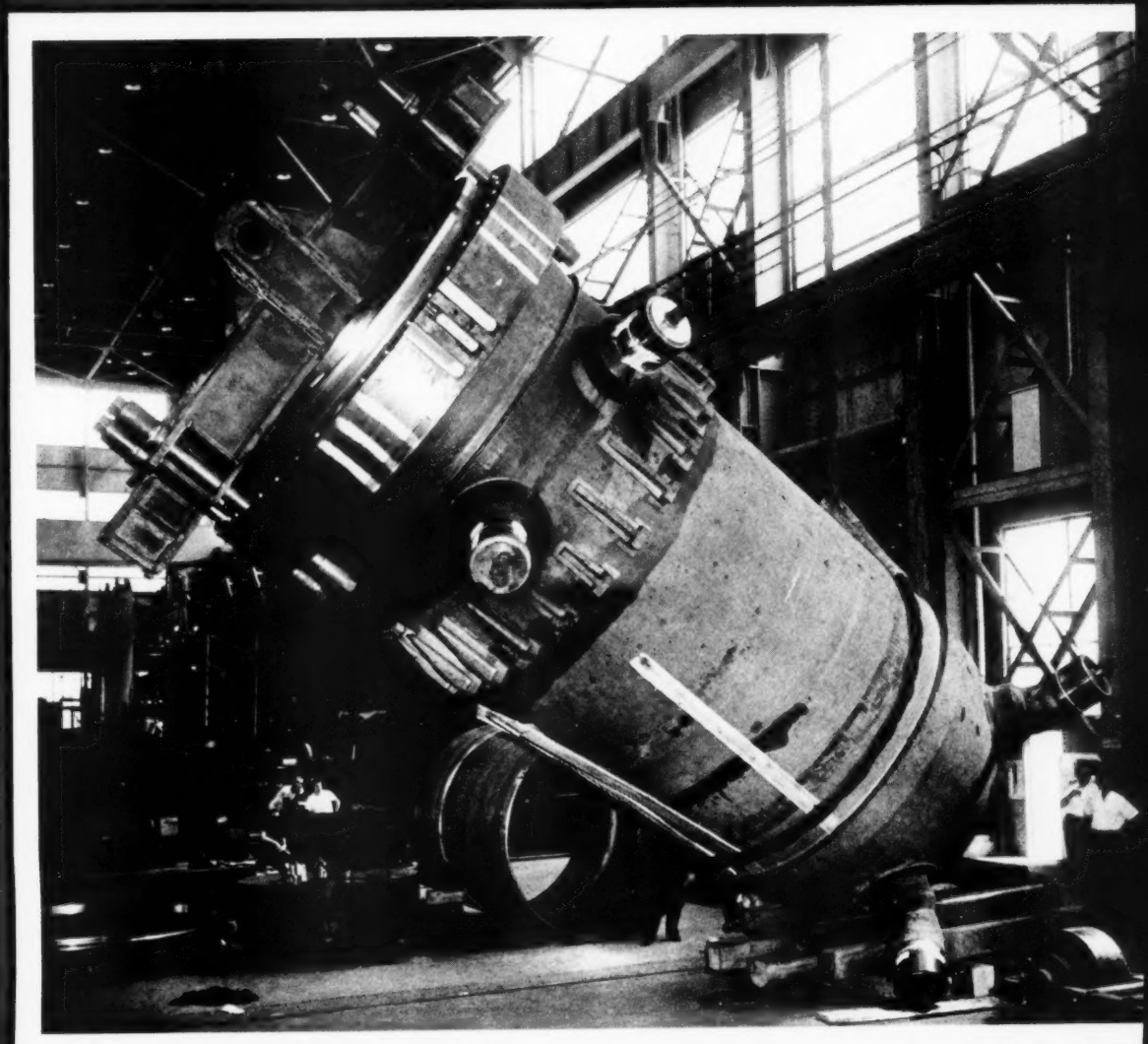

WESTERN SOCIETY OF ENGINEERS FOUNDED 1869

THE PEACETIME DEVELOPMENT OF ATOMIC ENERGY—PAGE THREE

Vol. 9 NOVEMBER, 1956 No. 6

Planned Pioneering

At New Products Corporation...
Is Typified by the Quality of

NPC Die Castings

- **ALUMINUM**
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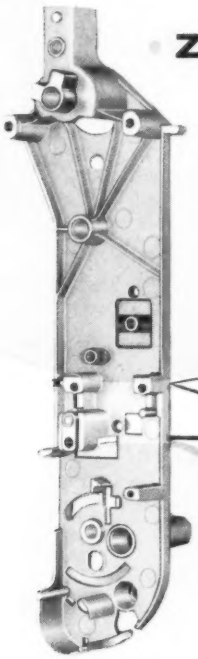


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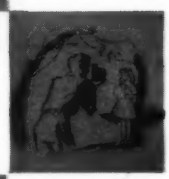
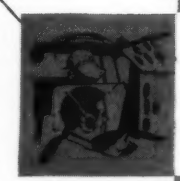

CAMERAS


HOME APPLIANCES


ELECTRONICS


HAND TOOLS


OFFICE EQUIPMENT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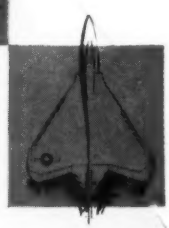
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Planned pioneering at New Products Corporation has resulted in die castings that give excellent performance in virtually all industries.

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In the spirit of planned pioneering—if, in any product line, it can be made better, NPC will make it better.

Excellent Tool-Making Facilities

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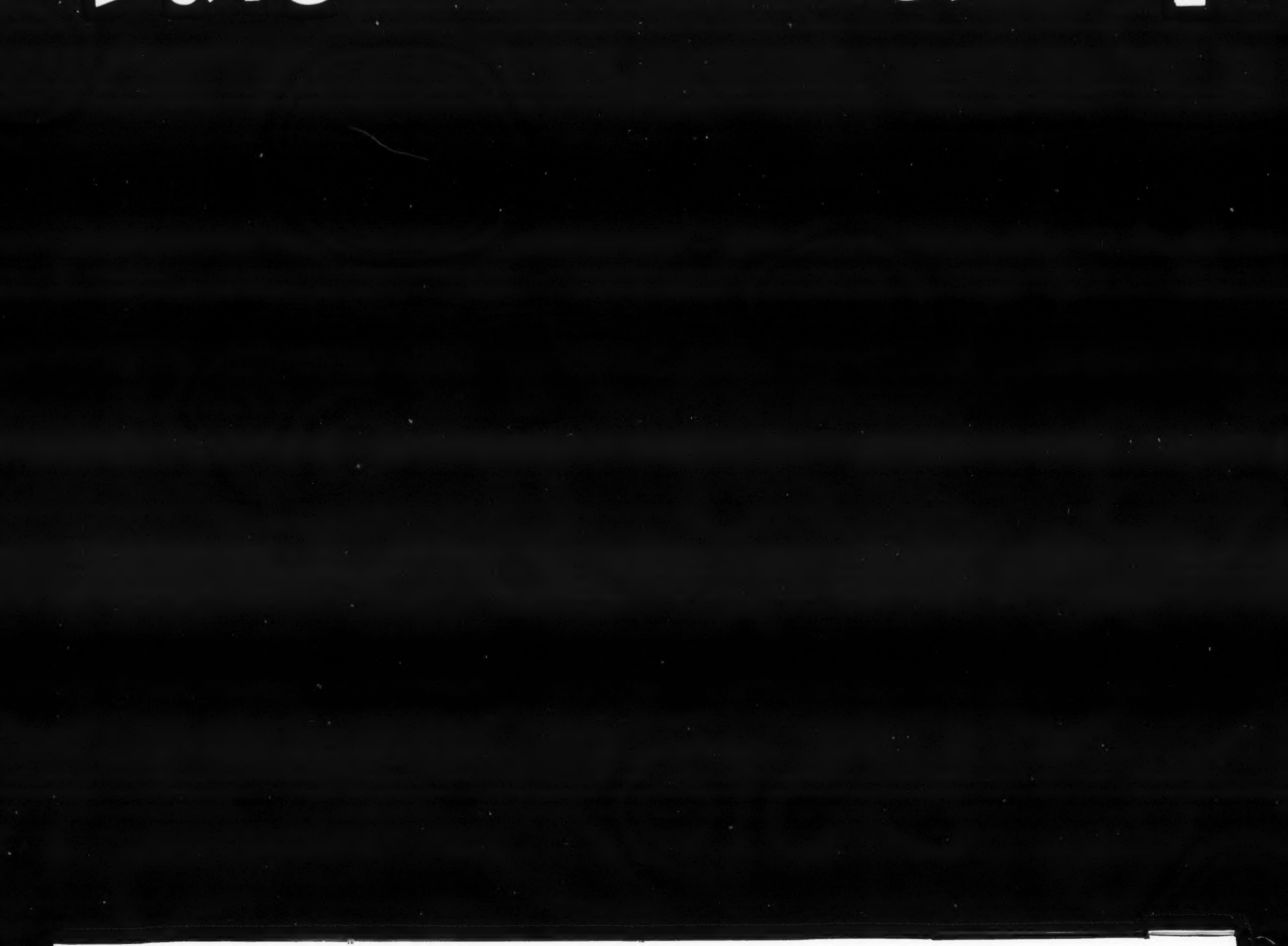

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November, 1956 Vol. 9, No. 6

CONTENTS

COVER STORY

We see on the cover this issue a view of the heaviest unit of atomic power equipment in the world, the 235-ton reactor vessel for America's first full-scale atomic power station, at Shippingport, Pa. The vessel, a huge steel container in which the nuclear reaction will take place, was designed by Westinghouse Electric Corp. under contract with the Atomic Energy Commission, and was built in Chattanooga, Tenn. by Combustion Engineering Corp.

There will be no

WSE General Meeting

in December

and no

Noon Luncheon Meeting

during the holiday season.

★

The Western Society extends to all: "Greetings of the Season"

The Peacetime

Development of Atomic Energy

By Major General K. D. Nichols, USA-Ret.

Mr. Chairman, Members of the Society of American Military Engineers, and Members of the Western Society of Engineers:

I am pleased to be here this evening for the purpose of discussing the peacetime development of atomic energy. I consider it a great privilege and an honor to address this audience and I am most pleased to discuss the atom in Chicago where so much of the scientific work pertaining to the development of the atom has been accomplished.

It is 14 years ago this July (1956) that I was initiated into the mysteries of the atom at the Metallurgical Laboratory at the University of Chicago. The Metallurgical Laboratory will celebrate its 50th anniversary on January 1. Chicago should be proud of the accomplishments of the Metallurgical Laboratory and its successor, the Argonne National Laboratory, not only for carrying out the early wartime scientific development that led to the atomic bomb but also for the record that has been established by the Argonne National Laboratory in initiating and carrying out work in developing the peaceful atom. I had the pleasure of spending this morning (Oct. 26, 1956) at the Argonne National Laboratory and I am most pleased that representatives of that group are able to be present here tonight.

This evening I propose to talk about the power aspects of the peaceful atom. I will trace very briefly the history of atomic power and will give you my ideas of where we stand today and where we may be going in the future.

In tracing the history of the atom I will confine my remarks primarily to the relation of this history to the development of atomic power, with perhaps a few digressions to cover the particular part that the Chicago area played and, because this audience is semi-military, to how the military application of atomic energy has assisted and influenced the development of atomic power.

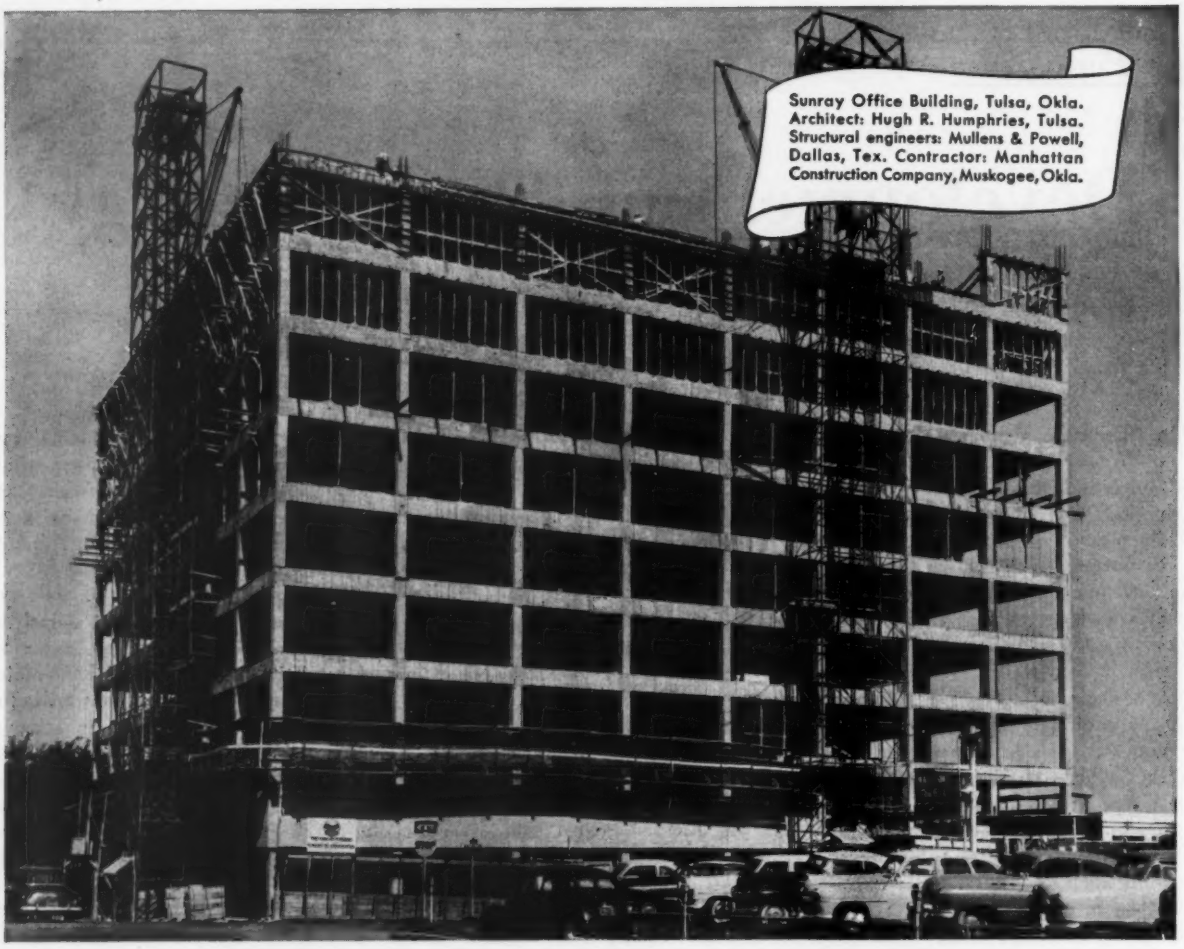
The real birth of atomic power took place less than seven miles from here on Dec. 2, 1942. The scientific effort for the production of plutonium had been mobilized at the University of Chicago, and the first controlled chain reaction took place in the old stadium on December 2. It is significant that the motivation for this first controlled chain reaction was to develop means to produce plutonium for use in an atomic weapon. Little or no effort was devoted at that time to how such a chain reaction could be utilized for the production of power, although every scientist realized that the accomplishment of such a chain reaction was the very heart of a future atomic power program. Everyone concentrated on the production of plutonium for weapons rather than how to develop a reactor that was more applicable to power.

In fact, all through the wartime project there was very little diversion from our objective of an atomic weapon at the earliest possible date. Certainly the natural desires of many of the scientists would have been to work on the peaceful use of the atom but they all kept their noses to the grindstone on the wartime application until the scientific and technical effort was well over the hump and success seemed in hand. It was not until the winter of 1944-45 that any appreciable effort was diverted to atomic power. The diversion was permitted at this time because it was desired to keep the scientific groups fully mobilized for possible trouble-shooting in the production end of the project, and it was recognized that a diversion to atomic power would accomplish this and at the same time permit some advance to be made in the peaceful development of atomic energy prior to the end of the war.

Also prior to the end of the war, discussion between scientific, industrial, and military leaders resulted in reasonably firm plans for continuing the Metallurgical Laboratory after the war. It was my pleasure to participate in some of these early discussions in 1945 and 1946 and I am most pleased to see the role that the Argonne Laboratory has played in the development of atomic power not only for military propulsion but also for production of electricity. The creation and the continuation of this great laboratory is one of the real assets that the peaceful atom has inherited from the wartime development. In addition to the Argonne National Laboratory and other regional laboratories, the wartime development provided other essential basic accomplishments that have greatly assisted in the development of atomic power. I would like to mention a few of these accomplishments.

First, the wartime project and the continuation of the military effort after the war have developed an ore supply that is adequate not only to supply our military effort but also to supply a power development for the United States and the world. The development of this ore supply was started early in the history of the Manhattan Project and has been continued by the Atomic Energy Commission since the war. In 1942 the only existing uranium mines were shut down and it was necessary to reopen them and, in addition, to explore for other sources. Immediately after the war many informed individuals had doubts that an ore supply could be developed adequate

General Nichols, now a consulting engineer with offices in Washington, D.C., presented these remarks at a joint dinner meeting of the Society of American Military Engineers and the Western Society of Engineers on Oct. 26, 1956 in Chicago.



Concrete Frames and Floors

. . . MONEY-SAVING CONSTRUCTION FOR MODERN OFFICE BUILDINGS

The Sunray Oil Company chose reinforced concrete frames and floors for its Sunray Office Building in Tulsa, Okla. The building is 12 stories high, 140 ft. by 150 ft. in plan and is built with pan joist floors.

New commercial structures like the Sunray Office Building can be built faster and with greater economy when designed with concrete frames and floors. These are two reasons why more and more modern buildings are being built with this type of framing.

Reinforced concrete frame and floor construction offers architects, engineers, contractors and owners many advantages. For example, frame and floor construction proceed simultaneously. Walls can be finished as the building goes up. Facilities for heating and ventilating, as well as plumbing and wiring can be installed as the structural work progresses. This saves time and money.

Competitive bids and cost analyses show that savings up to 40% on frame and floor costs are possible with concrete. Concrete is sturdy and firesafe, gives years of service with little upkeep. This ***low annual cost*** is a bonus for owners, investors and tenants.

For help in designing reinforced concrete frames and floors for structures of any size or for any purpose—for apartments, schools, hospitals or commercial buildings—write for free illustrated literature. Distribution is limited to the United States and Canada.

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to make atomic power a real influence even if the technical and economic problems pertaining to the development of atomic power could be successfully solved. However, continued exploration and continued aggressive Government support of the ore program have established an ore supply that appears to be adequate for many decades to come.

In addition to the ore supply, the wartime and subsequent military requirements developed the U-235 production plants. These large plants located at Oak Ridge, Paducah, and Portsmouth will not only produce enough material for our military effort but already President Eisenhower has seen fit to release some 40,000 kilograms of U-235 for use in production of power both here and abroad. It is questionable how long it would have taken to get the necessary appropriations to build these tremendous plants if the motivation had been solely atomic power rather than the primary purpose of meeting our military requirements with recognition given to the fact that in the future they could also meet our atomic power requirements. This marriage between military objectives and peaceful application has been advantageous to both developments.

Another asset that the peaceful development of the atom inherited as a result of military objectives is in the field of reactor technology. The first large-scale reactors were built at Hanford, Wash., during the war. Subsequent to the war our military requirements necessitated the expansion of the plutonium production plants at Hanford and the construction of additional reactors at Savannah River near Aiken, S. C. The development of the engineering talent and the scientific and industrial know-how for the design, construction, and operation of these plants has already proven invaluable in the subsequent development of atomic power.

In addition to these plutonium reactors, military requirements have also been the motivating force for the development of atomic reactors for power. Immediately after the war the Navy started work in studying the application of atomic power to the propulsion of submarines. As a result, the *Nautilus* has been in operation for almost two years, and we are making excellent progress in the development of power plants for a complete atomic Navy. Practically everything we learn in the development and operation of such naval propulsion plants will be of assistance in the development of economic atomic power plants for production of electricity or for development of power plants for commercial ships.

In addition to this naval effort there is of course the Army effort for the development of package power plants and the Air Force effort for the development of an atomic-powered aircraft. These three military projects will continue to push forward the frontiers of scientific and engineering development and will assist in achieving economic atomic power.

The military production and propulsion projects have also assisted in solving many of the health and safety problems. From the very beginning of the wartime project great attention has been paid to the health and safety aspects and a fund of knowledge has been established that permits us to evaluate more adequately these problems as they per-

THURSDAY, SEPTEMBER 27, 1956 THE FARMER CITY JOURNAL PAGE NINE

NATURAL GAS COMES TO FARMER CITY

Final Touch Prepares Jones Home For Gas

Setting the meter is part of converting customer to gas system. George Lane, tightens meter connections at Jones home as Marshall Jones looks on.

Jones Property On John Street Gets First Conversion

Natural Gas became a reality for Farmer City last Wednesday afternoon when gas was turned on at the home of Marshall Jones on N. John St. Thus another step was reached in the progress of Farmer City.

Officials of the Northern Illinois Gas Company of Bloomington, which has the franchise for furnishing gas in this vicinity and a few interested citizens were present when conversion from artificial to natural gas was made.

Farmer City has looked forward to having the use of natural gas for several years, especially since 1951 when on Aug. 16, 200 laborers of the Midwest Construction Co. of Tulsa, Okla, contractors for the Texas-Illinois Pipeline Co. were located here. They were employed in laying the big 30" pipelines for this company from Texas to Chicago.

These big gas pipes were laid near the Homer Bateman farm six miles east of town. W. N. Notley, supervisor of highways and railroads, was also here with a crew of workmen at that time, directing the work of tunneling beneath the New York Central railroad and laying the gas mains beneath.

On Nov. 1 of the same year, construction of the 35 mile gas pipeline by the Union Gas Co. of Bloomington, later united with the Northern Illinois Gas Co. to connect Bloomington, LeRoy and Farmer City with the Texas-Illinois line three miles east of the city, got underway.

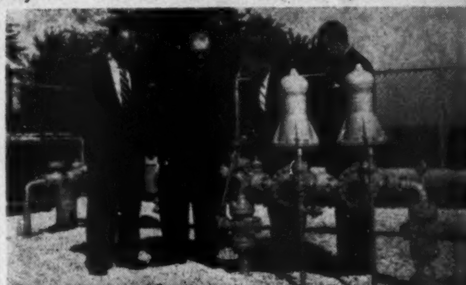
Announcement followed that the Illinois Commerce Commission had granted authority to the company to issue bonds to finance the construction of the line.

Announcement was also made that on Sept. 22 the Federal Power Commission had granted a "Certificate of Convenience and Necessity" to the Bloomington Co. to take natural gas from the Bateman site, the main line being constructed just south of the Lester Stewart farm. Distribution lines were then taken to Bloomington, which was shortly thereafter furnished with natural gas.

The anticipation of local citizens for this utility became more real on Aug. 1 when a crew of workmen from the Geneva Construction Co. poured into the city. Six inch gas mains were laid from the big pipe south of Stewart's following the road and under the Illinois Central tracks on Route 150 to N. Plum St.

Lines were then run down parkways and under pavements with the pipes for installation ... had pre- ... representa- ...

Mayor Stutzman Turns On Service Wednesday



Mayor F. M. Stutzman and H. G. Carr, division manager for Northern Illinois Gas, turn on gas service to community at utility's tap station at the north end of the city. Don Whittem, division operating superintendent for the gas company (left) and Harold Christ, division sales manager (right) look on. The fence-enclosed station is adjacent to gas company's two gas pipelines that also supply Bloomington-Normal area with natural gas. To supply this community, more than 52,000 feet of gas pipe was installed in the city prior to turning on the first customer.

First Gas Customer Gets Service

... of gas became a reality here last week when Northern Illinois ... turned on service at the Jones residence, 319 N. ... first customer to be converted to the new natural ... Jones, Editor E. S. Wightman and ... watch as the utility's ... following turn on of ...

Refrigeration Is Safe, Convenient

The modern gas refrigerator, cooled by energy from a tiny blue flame, answers one of man's oldest problems — the safe and convenient storage of food.

The gas freezing system is the only one in the world that is both continuous and automatic. Its smooth, silent operation maintains an even cold without any stop or start.

There is nothing to make noise or to break down in the gas refrigerator. It has no motor, compressor, belt, valves or other moving parts that turn, vibrate and grate against each other. Safety features are built right into the unit. An automatic shut-off of the pilot is provided in the event it goes out.

Designed for economy as well as comfort and convenience, the attractively styled gas refrigerator has a spacious freezing compartment, varied low temperature zones and the new single ice-maker. Its low temperatures curb wasteful spoilage of food and safeguard the family's health by stopping the growth of bacteria.

... supply of sparkling ... from the ...

Gas Appliances Make Chores Easier

Worried about those big holiday meals and annual family get-togethers that the calendar will soon bring around?

There's no need to be concerned. With pre-packaged and frozen foods, home freezers, and automatic gas appliances, the hectic holidays can be taken in stride by the modern homemaker.

Just one of the shortcuts now possible, for example, is cooking of the turkey several days in advance in your gas range. Pop it into the freezer for flavor safe-keeping. On the holiday, it's necessary only to place the bird in the oven for about 20 minutes of heating before serving.

Even if the housewife has no freezer, she needn't worry about extra holiday cooking cluttering up her range. In the modern two-oven gas range she can cook her turkey or roast and do her baking simultaneously. And the fast, flexible flame of the top burners means that vegetables can be cooked in a matter of minutes.

After mealtime? That's easy with the right appliances.

Plate scrapings disappear into the gas incinerator for quick, easy disposal. The dishes go ... automatic dishwasher ... can be cleaned in ... washer ... with plen... both ...

Adjusts Stove For Natural Gas

Adjusting all appliances that will use ... service ... by the gas company ... Jones and her daughter ... Where necessary, gas ... burned bottled gas ...

Family ...

While the news that natural gas has come to Farmer City, Illinois, may be only of local interest, it is symbolic of Northern Illinois Gas Company's growth and development. We're now serving 255 cities and towns, and our customer list is growing rapidly, too. In fact, new customers are being connected to our mains at the rate of one every 3½ minutes of each 8-hour working day.

Although the 1956 construction outlay will approximate 1955, the largest in the Company's history, our engineers are constantly eyeing the future. Present plans call for a continuing high level of construction of new and expanded gas facilities during the next three years. For the 4-year period ending in 1959, expenditures are now expected to total $74 million to keep pace with Northern Illinois' increasing use of modern gas service.

Gas Does It Better... For Less!

NORTHERN ILLINOIS Gas COMPANY

tain to commercial development of atomic energy. Much work in this field remains to be accomplished however.

These great stepping stones—the controlled chain reaction, trained knowledgeable organizations, adequate ore supply, production of U-235, know-how in reactor and power technology and health and safety considerations—have accelerated the economic development of atomic power by many years. Particularly if one considers the controversy, confusion, and diversion that is being tossed into the present program by emotional, social, and political factors, one realizes the advantages of having clear-cut military objectives that permitted early technical progress and an aggressive program during these formative years of atomic energy.

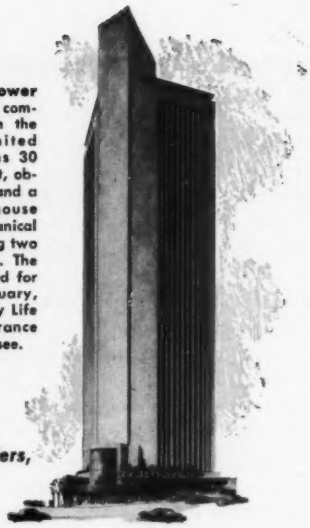
In tracing the history of atomic power, it is also of interest to consider the form of governmental control that has been superimposed on this most important industrial development. Of course, during the war there was no atomic energy act and military objectives dominated all other considerations. However, I believe that we should acknowledge that the military, wisely advised by our scientific and industrial leaders, can take credit for establishing many lasting and worthwhile principles during the period between the end of the war and the appointment of the first commission late in 1946. During this period the regional laboratories were initiated and established, a program was established for the distribution of radioisotopes for medical, research, and industrial use, a system of declassification was established, and a power program was initiated. Also, the Atomic Energy Commission has seen fit to continue the Manhattan Engineer District established principle of using industrial and scientific contractors for carrying on all atomic activities rather than the creation of large government organizations. This principle has done much to develop industrial organizations and industrial competition in the atomic energy field.

In 1946 the original Atomic Energy Act was passed and a virtual government monopoly was established over both the military and commercial aspects of atomic energy. Perhaps one of the reasons for including the peaceful development of atomic energy under this government monopoly was the sincere desire on the part of many to be in a better position to propose and establish effective international control of atomic weapons and atomic energy. This virtual government monopoly remained in effect from 1946 until the new Atomic Energy Act of 1954 was passed. In view of the present political controversy concerning who did what in the atomic power field and the claims and counterclaims concerning whether or not we are making adequate progress in the development of atomic energy, I believe it pertinent to comment that during this period of virtual government monopoly, construction was not started on a single large-scale power reactor in the United States.

The first large-scale power reactor in the United States is the Pressurized Water Reactor being designed by Westinghouse Electric Corporation and to be operated by Duquesne Light Company, which is being built at Shippingport, Pa. Ground was broken for this reactor on Sept. 6, 1954, and represents the first significant partnership between private enterprise and the Government for the large-scale development of atomic power. The Government owns the reactor, the Duquesne Light Company owns the generating plant, and the Duquesne Light Company also contributed to the development and operation cost of the reactor and contributed the site for the project. The reactor development project was authorized by the Atomic Energy Commission in July of 1953, invitations for industrial participation were issued early in 1954, the Duquesne Light Company proposal, among others, was received in March, 1954, and a contract with the Duquesne Light Company was signed in November, 1954. The design for this project is based on work initially carried out for development of a propulsion unit for an aircraft carrier. I believe it is also pertinent to comment that those individuals who are now criticizing the present Atomic Energy Commission because the United States does not have a large-scale power plant in operation should remember that it requires from three to four years to build even a conventional power plant and that if we were to have a large-scale atomic power plant in operation today, Commission authorization should have been given in 1952 or earlier. After the signing of the Atomic Energy Act of 1954 plans were developed for even greater industrial participation in the reactor program than that exemplified by the Pressurized Water Reactor project at Shippingport.

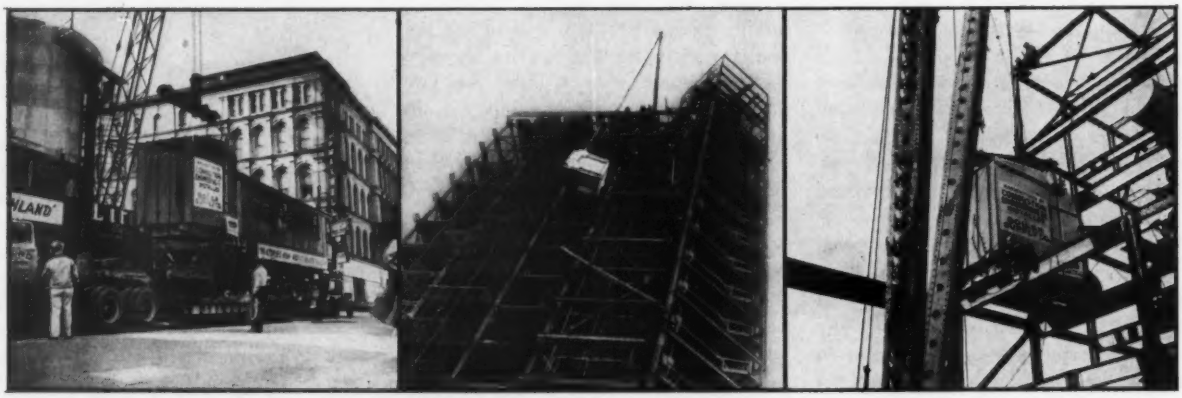
The Pressurized Water Reactor project was a part of the 5-year Reactor Development Program formulated by the Atomic Energy Commission in 1953 as a result of a letter dated July 31, 1953, from the Honorable Sterling Cole, chairman of the Joint Committee on Atomic Energy. This 5-year program

You can put a VP boiler ANYWHERE!



[1]**Life and Casualty Tower** will be the tallest commercial structure in the southeastern United States. It contains 30 floors plus basement, observation platform and a three-story penthouse containing the mechanical equipment—including two VP package boilers. The building is scheduled for occupancy in January, 1957. It is owned by Life and Casualty Insurance Company of Tennessee.

. . . anywhere the floor-loading's adequate, of course. In Nashville's nearly-finished Life and Casualty Tower, two Combustion Engineering Package Boilers, Type VP, were installed in a 32nd-floor penthouse — nearly 400 feet above the street. The pictures show how the job was done.



Take It Away—First of two VP Boilers—27,000 pounds—clears the truck bed in the first step of its 32-story journey. VP Boilers come fully assembled, ready for water, rail or road shipment anywhere in the world.

Almost Home—This VP has probably shattered the altitude record for boilers now—and it has another 30 or 40 feet yet to go. That's one of the advantages of the VP. You pick the spot and the rigging boys will find a way to move it in.

Boiler in a Penthouse—Now it's almost settled in its permanent skytop home; about set to bring up number 2. When the floor is ready, they'll hook up fuel, water and the job's done. They'll burn gas in these boilers, with oil as stand-by.

The completely shop-assembled VP Boiler, shown at left, is available in fourteen sizes from 4,000 to 40,000 lb steam per hr ... for operating pressures up to 500 psi ... for pressure firing of liquid or gaseous fuels. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The larger lower drum—30-inch diameter—permits a simple, symmetrical tube arrangement ... greater water storage capacity ... easy access for washing down or inspection. A low speed centrifugal fan which is exceptionally quiet in operation is standard equipment. The simple baffle arrangement results in low draft loss ... simple soot blowing ... no dead pockets ... high heat absorption. The VP is enclosed in a reinforced, gas-tight, welded steel casing, and shipped completely assembled with firing equipment, fittings and forced draft fan. For foundation, the VP Boiler requires only a simple concrete slab.

C-E **COMBUSTION ENGINEERING**

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was presented to the Joint Committee on Atomic Energy in February and March of 1954. The program incorporated plans for full-scale construction of the Pressurized Water Reactor.

The 5-year program also called for a research and development program at a cost of $8.5-million per year and five specific reactor development projects. The total estimated cost for the entire five years was $199-million. The 5-year program was considered at the time to be a definite acceleration of the atomic power program. Today it looks small compared to what is under way.

The next step taken to accelerate the atomic power program was the Atomic Energy Act of 1954. This Act permits and encourages free enterprise to assume greater responsibility for the development of atomic power and eliminates the virtual Government monopoly that existed under the Act of 1946. After passage of the 1954 Atomic Energy Act the Power Reactor Demonstration Program was formulated. This program was announced by the Atomic Energy Commission and explained to Congress early in 1955. I had the pleasure of participating in the formulation of ground rules for this program and in defending these ground rules before the Joint Congressional Committee. It was hoped that this joint program would encourage private enterprise to participate in the construction and operation of large-scale power reactors whenever the Government experimental program had demonstrated that a large-scale reactor might be feasible. It was also hoped that the program would enable private enterprise to be in a position to carry the bulk of the financial load and that the Government participation would be confined primarily to research and development assistance. There was nothing in the Power Reactor Demonstration Program that prohibited or discouraged private enterprise from assuming full financial responsibility, by way of the straight licensing route, without Government assistance of any sort.

Invitations for the Power Reactor Demonstration Program were issued in January, 1955 and the first deadline for response was set for April 1, 1955. I believe that practically everyone that participated in establishing this program was agreeably surprised with the response. The response was greater than had been anticipated. Four proposals were received. In addition, Consolidated Edison requested a license for a plant. Subsequently, the Commonwealth Edison proposal was also converted to a license application. Neither of these large projects requires any Government financial support. Two of the proposals from private utilities, those from the Power Reactor Development Company and from Yankee Atomic Electric Company, requested Government assistance in the research and development field; and the fourth, from the Consumers Public Power District of Columbus, Neb., also requested Government assistance.

A subsequent request for proposals brought an additional response from both private and public power groups. In addition, other projects, such as the Pennsylvania Power and Light Company and Westinghouse Electric Corporation proposal for carrying out work in the homogeneous reactor field, have resulted in plans being made, and in some cases construction actually started, for every type of reactor that was orginally included in the 5-year Government program and for some of the types that have subsequently been included in the Atomic Energy Commission's expanded experimental program. In fact, the response to this partnership between Government, private utilities, and public power groups has been such that if United States power needs alone are considered, the program is more than adequate to insure development of economic power in time to meet our expanding electric power requirements. The response has also shown that such a partnership not only broadens the base and increases the talent available for such industrial development but also increases the amount of money available for such development and, in addition, puts a greater incentive on achieving cheaper power. The response is surprising, considering U.S. power needs and the stiff competition offered by the price and availability of conventional fuels.

Atomic power does not promise cheap electricity. The advantage of atomic power is not cheap power in the ordinary sense of the word. However, the atom does have two advantages that are significant. First, the availability of uranium ore promises to make the atom a greater potential source of power for the world than would be possible if we confined our power development to hydraulic and fossil fuels. Although the United States has reserves of coal adequate for many decades, these reserves will run out in time, and many parts of the world are already facing a shortage of fossil fuels. Uranium permits us to

(Continued on Page 18)

Sandwich Panels May Replace Columns

"Sandwich panels" may soon take the place of columns and other conventional supports in a number of different types of buildings, according to Edward Kuenzi, a leading scientist at the U. S. Forest Products Laboratory, and chairman of the American Society for Testing Materials' Committee on Structural Sandwich Panel Constructions.

Kuenzi spoke at a two-day conference on the design and use of sandwich panels, attended by building industry leaders and sponsored by The Bettinger Corporation of Waltham, Mass.

Kuenzi said that despite the fact that the load bearing capacity of properly designed structural sandwich panels has been conclusively proved in tests, only the aircraft industry has taken full advantage of this fact to date.

He said, however, that because of the increasing need for cutting building costs, while at the same time maintaining high standards, sandwich panels are bound to become more and more important in building.

A number of speakers at the conference emphasized the growing popularity of porcelain enamel wall products which offer builders a wide range of color possibilities, plus a maintenance-free surface.

According to F. D. Shaw, Bettinger vice-president and general manager, one of the main results of the inter-company conference will be to spur the "number of significant experiments" in the curtain wall field. Bettinger plans other similar gatherings periodically, to encourage improvements in design, assembly and installation of panels.

A portion of the first day's meeting was devoted to a discussion of adhesives used in panel fabrication. This session was led by George Schulte, manager of product development for the Minnesota Mining and Manufacturing Co.

Attending from the Inter Island Gas Co. of the Philippines was Canuto Borremeo. Inter Island Gas is one of the members of The Bettinger Corporation International Family of Companies. From Sico, Inc., another Bettinger affiliate, attendees were Ralph Frobisher, president, and Board Randall, vice president.

CRERAR LIBRARY
News and Notes

The June issue of *Midwest Engineer* carried the announcement of the building development in Crerar Library which will result in air conditioning the book stacks and in making available a limited number of research offices for use by company research personnel. Work on this development is in full swing and will be completed early in 1957.

Additional plans of special interest to WSE members call for adapting the first elevator in the Library Building to give added elevator service to the 6th and 7th floors of WSE quarters. Access to the remodelled Crerar elevator on these floors will be through lobbies to be constructed just north of the present automatic elevator now serving WSE.

* * *

The Translations Center maintained by Crerar Library for the Special Libraries Association is being greatly expanded under a grant to the Association from the National Science Foundation. The grant of $20,350 will enable the Center to "collect, announce, and sell photocopies of scientific translations of articles from all languages." The present collection in the Center now has more than 8,000 translations from languages other than Russian. To these will be added in January, 1957, some 5,000 or more translations of Russian scientific papers.

The Translation Center is a cooperative venture national in scope, with translations being deposited by companies, government agencies, societies and individuals. During the four month period July 1 - October 31, 1956, translations received numbered 2,000, and it is anticipated that the collection may continue to increase at this rate for some time.

Announcement of translations available from the Center is provided by *Translation Monthly* which is offered at an annual subscription rate of $5.00. The NSF grant will enable the Center to increase the size of *Translation Monthly* by four times, beginning with the January, 1957, issue, without any increase in the subscription rate. Because of the normally high cost of translating service, a subscriber needs to acquire no more than one translation a year to more than offset the cost of a subscription.

Photocopies of translations are available through the Photoduplication Service of Crerar Library at regular photocopy rates plus a small service fee. Additional information about the Center and its services, subscriptions to *Translation Monthly*, and photocopies of translations may be obtained by addressing inquiries to:

SLA TRANSLATIONS CENTER
The John Crerar Library
86 East Randolph Street
Chicago 1, Illinois

* * *

The following officers of Crerar Library for 1956-57 were elected at the annual meeting of the Board of Directors: *President:* H. P. Sedwick, *First Vice President:* Dr. John T. Rettaliata, *Secretary:* Joseph B. Stockton, and *Treasurer:* Solomon B. Smith.

TV Via Helicopter

Television pictures have been transmitted from a helicopter at altitudes between 500 and 2500 feet to a receiving location 50 miles distant, reports *Electronics*. The new system may be used by the Navy for control of sea landings.

NSPE Meets and Discusses Education

Education preparatory to the collegiate level is strictly a matter for the local government, the National Society of Professional Engineers agreed at their fall meeting in October at White Sulphur Springs, W. Va., but the Society did endorse steps to encourage students in the upper 25 per cent of their high school class to attend college.

The National Society, in extending its national policy on engineering education, also supported moves to provide better instruction particularly in the fields of mathematics and science, as well as the development and expansion of the educational programs of technical institutes.

Financial support through federal funds for students not having received their bachelor's degree was opposed by the NSPE.

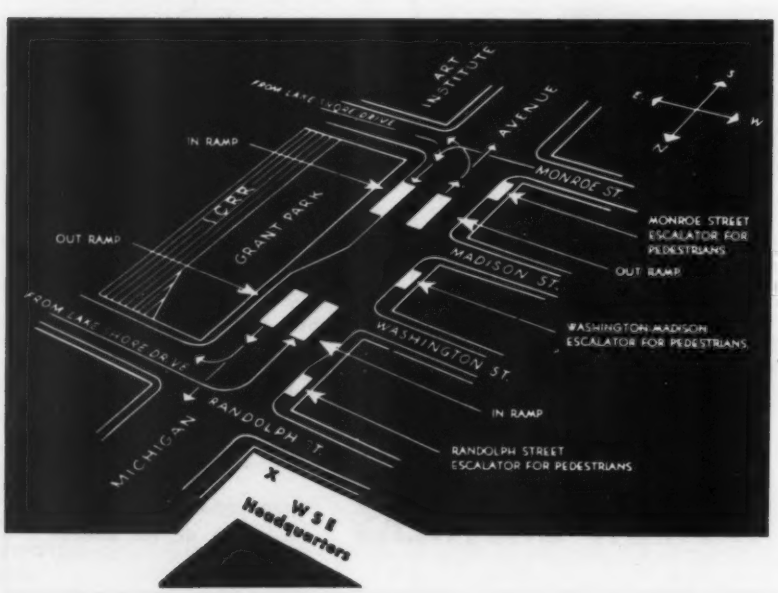
In other developments, the Task Forces of the newly formed Functional Sections for Consulting Engineers in Private Practice gave an extensive report at the meeting which brought together the directors of the National Society representing the forty-one state societies. The Task Forces—organized in May — were formed to investigate problems in such areas as fees, professional liability insurance, etc.

SAY, ENGINEER!

Do you like to DRIVE?

Then why not drive to WSE meetings and other functions? There's plenty of PARKING almost at the door—the Underground Garage is diagonally across the street from WSE Headquarters (see the map below), two private garages are a block west, and the State-Wacker "Bird Cage" Garage is only a short distance away.

Below: map showing Park Department Underground Garage



Interior view of Underground Garage

If you're not driving it's still convenient to get to and from WSE meetings.

Here are handy stations or stops:

- The Cab Stand is just across the street
- The Elevated is one block west
- The Subway is two blocks west
- Buses stop at the door or within a few blocks for every part of town
- The IC Suburban station is across the street
- Other suburban stations are conveniently served by bus or elevated.

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CAPACITY The garage with its 2359 parking spaces, is designed to prevent overcrowding.

Multiplex Telegraph Utilizes Transistors

Details of a multiplex telegraph set using transistors instead of vacuum tubes were outlined at the Fall General Meeting of the American Institute of Electrical Engineers in Chicago.

Four models of the 36-inch high set that weighs only 275 pounds are now being field tested, F. D. Biggam, of Teletype Corporation, Chicago, reported at a session on telegraph systems. The transistorized set uses only five per cent of the power consumption of the equivalent electron tube set now in service, he said.

The weight, size and power savings are made possible by the application of 550 transistors and 700 germanium diodes, Biggam pointed out, adding that the smaller size would fit the space requirements in mobile and shipboard installations.

"The Transistor Multiplex," he said, "while still in the developmental stage, has shown promise of providing extremely high reliability in operating service. Transistor and component failures traceable to circuit operation have been almost non-existent. Some breadboard circuitry has been operating for as long as two years without failure."

International Nickel Founds Scholarship

A scholarship designed to encourage liberal arts students to acquire an engineering education has been established at Illinois Institute of Technology, Chicago.

The full-tuition grant, initiated by the International Nickel Company, Inc., New York, will become available for the full semester of the 1957-58 school year.

In addition to covering tuition for one year, the award provides $300 for books and living expenses. It is renewable for the second year.

The scholarship will be awarded to students who transfer to Illinois Tech from one of the 29 liberal arts colleges participating in IIT's "3-2" combined study plan.

Under the "3-2" plan, a student spends three years in liberal arts college and two years at IIT to receive both a liberal arts and an engineering degree at the end of five years.

The International Nickel Company scholarship is similar to the Thomas Lundberg scholarships which were established at IIT in 1954 to make available an engineering education to students taking advantage of the combined education program.

In awarding the International Nickel Company scholarship, preference will be given to students in mining, geology, and metallurgy.

Technical Report 'Workshop' Scheduled

Workshops aimed at providing engineers and scientists with instruction and practice in preparing technical reports will be conducted March 17-29 and Sept. 16-27, 1957, at The Pennsylvania State University.

Staff for the Technical Report Writing Seminar will consist of Dr. Dwight E. Gray, program director for government research information, the National Science Foundation; Arthur G. Norris, director of technical information of the Vitro Corporation's engineering division; and Christian K. Arnold, associate professor of engineering research and technical editor of the Ordnance Research Laboratory at Penn State. Evening lectures will be presented by other experts in the field of technical writing.

Emphasis during the seminar will be on the workshop aspect of training, with half of each day devoted to practice, the remainder to lecture and discussion. Topics will include functions and use of illustrative material, nature and function of the technical report, pitfalls in grammar, mechanics, punctuation, and editing and illustrating techniques used in technical reports.

Enrollment will be limited to 40 persons in order that each may receive individual guidance. Registration is now open.

Further information concerning the seminar, conducted by Penn State's College of Engineering and Architecture and General Extension, may be obtained by contacting T. Reed Ferguson, Extension Conference Center, The Pennsylvania State University, University Park, Pa.

Digital Computers To Do Routine Work

Digital computers "may be expected to take over a rapidly increasing amount of routine calculating and data processing," a University of Wisconsin educator said.

H. A. Peterson, chairman of the University's Electrical Engineering Department, told the Fall General Meeting of the American Institute of Electrical Engineers in Chicago that encouragement should be given those now trying to use digital computers to solve problems for which special purpose analog computers have been and are being used.

"This does not necessarily mean that such special purpose machines will suddenly be made obsolete," he said. "The problems available are so numerous and so varied in degree of complexity that analog as well as digital computer installations should rightfully expect to be kept busy. With good judgment, each installation should be in full use solving those problems for which the particular equipment and staff is best suited."

Professor Peterson warned that computers are not an end in themselves but should be thought of as tools for better understanding of complex physical problems and relationships.

Far from being a new machine, he said, the computer has a history dating to 1642 when Blaise Pascal, the French philosopher and mathematician, built elementary machines to assist in computation of taxes. Various others tried their hands at computers, but it was not until more than 200 years later that punched-card and computing equipment was used in connection with the 1890 census. High speed digital computers have been in use only a few years.

Although computers are popularly known as "electronic brains," they have a lot of limitations; for instance, they cannot do engineering, nor think up problems to solve, nor reproduce themselves, nor retrain the people they replace, nor cure themselves when ill, nor maintain themselves.

"A digital computer," Professor Peterson remarked, "is a powerful tool which enables scientists, engineers, accountants, statisticians, and other groups of people to more effectively realize useful results of their mental effort. Just as the coming of new machines in the Industrial Revolution and following have amplified brawn power, so the coming of the large scale computers in our present day provides the opportunity for us to amplify brain power."

A Safe Building

From first excavation to final clean-up, 691 days and 750,000 man-hours of work, not a single employee suffered a disabling injury in construction of an insurance company building in Minneapolis, Minn., *Construction Methods and Equipment* says. Twenty-three accidents had been expected, based on the average for the type of job. It was the first major building ever erected in the Minneapolis-St. Paul area without a disabling injury.

Graphics Teachers To Meet in Houston

Engineering graphics teachers from colleges throughout the nation will meet at the Rice Institute, Houston, Tex., from Jan. 30 through Feb. 2, 1957.

The annual mid-winter meeting of the Engineering Drawing Division of the American Society for Engineering will include eight technical papers and two technical inspection trips. The role of graphical methods in modern engineering procedures will be emphasized.

Following a report on the use of exploration information in oil field development by J. S. Blanton of the Seurlock Oil Company on Jan. 31, ASEE

members will visit the Pierce Junction Oil Field to inspect drilling operations and field production problems. A field trip to the Galveston area is planned for Saturday, Feb. 2.

At a banquet on Friday evening in the Rice Institute Commons, Dr. Carey Croneis, provost of Rice and head of the Institute's Geology Department, will speak on "South America in Color."

Other speakers at technical sessions will include Professor Steven A. Coons of the Massachusetts Institute of Technology, Professor S. B. Elrod of Purdue University, Dr. L. D. Haskew of the University of Texas, Professor J. R. Holmes of the University of Texas, Dr. W. M. Ruse of the Humble Oil and Refining Company, Professor J. R. Sims of Rice Institute, and Professor C. H. Springer of the University of Illinois.

The Houston chairman for local arrangements is Professor A. P. McDonald, head of the department of Engineering Drawing at Rice. Registration will be at the Shamrock Hotel, Houston, and all sessions will be at the Rice Institute campus.

Rice Institute is a privately supported, tuition-free, co-educational university.

Expensive Fires

Between 30,000 and 40,000 fires occur annually in manufacturing plants, *Power* reports. There is an industrial fire costing at least $250,000 each day of each working week.

Food Packaging Seminar Instituted

The nation's first graduate seminar in food packaging has been initiated this fall by the food engineering department at Illinois Institute of Technology, Chicago.

Students, the majority of whom are engaged professionally in food packaging technology, meet weekly with a prominent packaging executive and discuss problems in his specialty.

"The course was started because we felt there was a need for a specialized program covering the various aspects of food packaging," said Milton E. Parker, director of IIT's food engineering department. "We hope to make this seminar a regular part of our evening division program."

A limited enrollment and the seminar basis on which the course is conducted give the students and the lecturer maximum opportunity for discussion, according to Parker.

Subject matter discussed by the class includes requirements in packaging from the design and merchandising standpoint, the organization of a packaging department, planning the package, all-metal containers for unsterilized foods, and quality control in food packaging.

Among the class lecturers are Jay Doblin, product designer and director of IIT's Institute of Design; Charles J. Zusi, packaging consultant; Clarence K. Wiesman, manager of research and development of Armour and company; Roy B. Stover, packaging research director, Owens-Illinois Glass company; Charles W. Kaufman, vice president, Kraft Foods company, and W. D. Jackson, Container Corporation of America.

Liberia Builds Road

Initial work on Liberia's multi-million dollar highway program is expected to begin soon with construction of a 150-mile road in the interior of the country, on the western coast of Africa. *Engineering News-Record* reports that the road will be financed by a $12-million loan from the United States. The project engineer will be James Hoban, who supervised construction work on the Pennsylvania and Ohio Turnpikes and the Garden State Parkway in New Jersey.

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'57 May be Big Ultrasonic Year

American industry, led by the Air Force, Navy, and Atomic Energy Commission, will buy more ultrasonic equipment in 1957 than in all previous years, it was predicted on Nov. 14 at an ultrasonics symposium held at the Yale Club, New York City. However, the symposium was warned of "artificial barriers that threaten to slow future progress unless industry takes cooperative action now."

The market for industrial application of ultrasonics, silent but remarkably powerful sound waves, will undergo a three-fold expansion in the next 12 months. "Silent" sound waves will drill odd-shaped holes in diamonds, glass, and other hard materials; sound waves will clean and degrease precision equipment faster than any other method, microscopically clean and sterilize surgical instruments immersed in cold water, decontaminate radioactive objects, solder aluminum in the absence of flux, dye fabrics, sense the liquid level in a tank, ferment beer, detect hidden flaws in metal, detect tumors in the human body, and treat arthritis.

This progress report by engineers at the luncheon symposium on "Ultrasonics — A New Tool For Industry" was coupled with a warning about threats to future progress from *Robert L. Rod*, president of Acoustica Associates, Inc., leading designer and manufacturer of ultrasonic systems, co-sponsor of the symposium. Rod said that users and manufacturers of ultrasonic equipment must cooperate to overcome three barriers: "lack of research among prospective users, lack of industry-wide quality standards, and unnecessary secrecy about new discoveries."

The symposium and practical ultrasonic demonstration was jointly sponsored at the Yale Club by Acoustica Associates, Inc. and by Mullard, Ltd., one of Britain's largest electronics manufacturers, to describe their cooperative plans to speed ultrasonic development in industry.

Rod declared that "industry must be made to understand that the first requirement of successful introduction of ultrasonics is technical liaison conducted without restraints of usage secrecy."

New ultrasonic discoveries from Britain soon will be made more readily available here as a result of official appointment on Nov. 14 of Acoustica Associates, Inc. as national distributor of Mullard's ultrasonic devices, including an autrasonic drill and a low-cost ultrasonic soldering iron, both made in England.

Acoustica revealed that it had stepped up production more than 175% at its plant in Glenwood Landing, Long Island, N. Y. to meet ever-increasing demands for ultrasonics systems from every field such as auto electronic and guided-missile manufacturers to nuclear plants, food processing plants, textile mills and hospitals.

Other speakers at the symposium were Dr. Miguel Junger, of Cambride Acoustical Associates and recently research fellow of the famed Harvard University Acoustics Laboratory, who spoke on research into the future of ultrasonics; E. Joseph Porto, vice-president of International Electronics Co. (Mullard, Ltd. products); and Paul M. Platzman, symposium chairman and Vice President of Acoustica Associates.

Mr. Platzman described "the largest, most powerful ultrasonic system in the world," a cleaning and degreasing system for the Atomic Energy Commission, produced and installed by Acoustica last September. He said this recognition of ultrasonic techniques by atomic energy authorities and also by university laboratories and large industrial concerns has "catapulted ultrasonics almost overnight from a laboratory curiosity into a multi-million dollar industry today and to a several billion dollar industry in the foreseeable future!"

Guests at the symposium, including over one hundred engineers, scientists, and technical editors, observed practical demonstrations and operated themselves for the first time heretofore secret devices and new applications. Some military applications of ultrasonics, unavailable before now, will become available commercially this year, it was reported.

The basic principles by which ultrasonics cleans objects and performs other functions was described as a "cold boiling" scrubbing effect. Inaudible sound waves or vibrations pitched too high to be heard by the human ear, above 18,000 cycles per second, are created by ultrasonic transducers, electrically produced by generators. The sound waves irradiate a liquid, setting up "cold boiling," known as cavitation, within the liquid. The sound waves bring about repeated formation and collapse of millions of tiny entrapped vapor bubbles many thousand times per second.

The cavitation gives a scrubbing action powerful enough to break surface tension of grease or contaminants and thus "blast" clean whatever objects are immersed in the liquid, penetrating the deepest recesses of the object.

In addition to decontamination of radioactive objects, this cleansing principle is important in manufacture of precision electronic and guided missile components, and in sterilizing surgical instruments.

Non-destructive testing of metals is another widely-used application of ultrasonics and in preventive maintenance alone has saved industry tremendous amounts of money by discovering defects before the breaking point is reached.

Ultrasonics is also doing a job, either alone or as a big assist to conventional methods, in many other applications.

Atomic Energy

(Continued from Page 9)

continue to expand our consumption of electricity for many generations to come. The second advantage is that development of the atom reduces the factor of cost that is due to transportation of either fossil fuels from the sourse to the place where power is needed or transmission losses in transmission of power from a potential hydraulic source to the place where it is needed. Atomic power is particularly advantageous to those areas remote from fossil fuel sources and lacking in potential hydraulic power sites. For some time to come I do not foresee that atomic power will be cheap enough to compete in the heart of a good coal region. Certainly, no plant on the drawing boards today can compete with the 4-mill power that is available in the Ohio Valley. However, we are getting close to atomic power plants that show promise of competing in the 8-mill areas such as parts of New England, and there are plants under design today that would compete in even higher cost areas, particularly in some foreign countries that do not have adequate supplies of fossil fuels. In fact, this factor of transportation cost may result in it being economic for a long time to come to use coal-produced electricity in the Ohio valley to run U-235 plants to produce U-235 for use in producing higher cost but competitive power in areas away from the Ohio valley. Transportation of U-235 is cheap compared to transportation of coal.

During 1956 a controversy has arisen over the future development of atomic power in which the question has been raised concerning whether or not our program is adequate. Some of those who question the program are out-and-out advocates of public power, others question it on the premise that international prestige demands that we not only maintain our lead in technical development but that we must also enter into a race for kilowatts and have a program larger than anyone else. The United Kingdom program and the U. S. S. R. program are frequently cited as being in advance of our own. I question whether many informed objective individuals sincerely believe that either the United Kingdom or U.S.S.R. is ahead of us in the over-all technical development of atomic power. The usual citation is that the United Kingdom and U.S.S.R. programs call for development of a greater number of kilowatts at an earlier date than the United States program, or great importance is attached to the fact that the Calder Hall plant is now producing power in England. Argument is also made concerning what part of the program is firm and what part is only a paper commitment.

I regret that this controversy has tended to lump the United Kingdom and U.S.S.R. competition in the same category. We are making every effort to cooperate with and assist the United Kingdom and certainly we must give consideration to the United Kingdom's need for power and also to her need for prestige. I have talked to several representatives of the United Kingdom and they do not represent that the United Kingdom is ahead of the United States in the over-all development of atomic energy. They do, however, steadfastly maintain that cooperation between the two countries in the development of power will help both countries. Further, it is obvious that the United Kingdom program has reasons for acceleration from an over-all economic point of view that do not apply to the United States program. The United Kingdom is in the position where she can no longer supply her expanding power demands from her domestic coal supply. Purchase and transportation of coal from the United States not only is costly but requires dollars. In addition, the Suez crisis further points up U. K.'s dependence on foreign fossil fuel sources. As a result, the United Kingdom is planning to build atomic power plants to make up for her deficiency of national coal and oil resources. Further, the United Kingdom apparently has requirements for plutonium for weapons beyond that provided by existing plutonium production plants. The result is that the reactors being constructed and put into operation are basically plutonium producers, with power as a by-product. This permits considering 7 mills as the price per kilowatt for power and the allowance for plutonium covers the actual additional costs. Perhaps the United States should have done likewise—combining power production with plutonium production—but the time for such a decision in this respect was more logical in 1948-52 than it is today. This was the period when we were authorizing and appropriating funds for new reactors for military objectives. Dual purpose plants at that time would have done much to advance the technology of atomic power plants.

It is unfortunate that a political controversy has arisen concerning the development of atomic power. The technical task of achieving economic atomic power is difficult enough without po-

litical controversy and the resulting time it takes in resolving petty as well as fundamental issues. Certainly it would be better for the world and for the United States if the technical development could continue without such controversy, but perhaps this is too much to hope for when one considers the importance of power to our social, economic, and political life.

In regard to the question of whether or not the United States program should be accelerated, I believe the answer is, yes, we should accelerate further our atomic power program. However, I believe the acceleration should be aimed at the objective of achieving cheaper atomic power and should not consist of participating in an international race to see who can build the most kilowatts of atomic power. We have no need in this country for building duplicate plants solely for the purpose of being able to add up a greater number of kilowatts. Such a venture would be extremely costly and wasteful and would deny us many of the ultimate advantages of atomic power. We should, however, be moving forward rapidly to develop, design, and construct such plants that permit us to acquire the maximum know-how and to make the maximum progress toward the objective of lowering costs. If we were to follow this objective I believe that for the next five years, and possibly for ten years, the United Kingdom might logically be building greater capacity because they can afford to be building duplicate plants as they are doing in the interest of meeting their power needs. This should not deprive us of any prestige if it is clear to ourselves and to the world that we are actually leading in the technical race for cheaper power. Once we achieve cheaper atomic power, the United States will also win the race for kilowatts.

Concerning the question of *how* this acceleration can be accomplished, I believe that we should avoid any program that tends to socialize the atom. We do not need to socialize the atom in order to achieve maximum progress, nor should achieving maximum progress be the basis for resolving the issue between public and private power. In this regard, I do not believe that a large program for Government construction and ownership of power plants is the best answer. Such a program might very well tend to favor the public power side of this controversy and would tend to socialize the atom. However, more important than this potential political factor is the probability that this is not the best way to achieve the cheapest power at the earliest possible date for United States and world needs. Generally speaking, government monopoly, or even government direction, does not get the most economic results. If our objective was solely to bull through plants to produce a large number of kilowatts, a Government program might be in order. However, with the objective to get cheaper power, our free enterprise system has a better record of past performance for getting economic competitive results when over-all costs are considered. There is also another argument against the proposal for the Governmnt to build large atomic power plants on present Government sites and utilize the power for its own requirements. In the present atomic energy program the largest requirements for electricity are for the U-235 production plants at Oak Ridge, Paducah, and Portsmouth. These plants were located where they are because cheap power is available from both the TVA and the private utilities because of the proximity to our best source of coal. At the present time the power requirements for these three production plants are being met by extremely large coal-fired power plants built specifically for the purpose. The price for this power, both from TVA and from private utilities, is less than 4 mills. The cost of this power is one of the large factors in the established price for Uranium-235. If we were now to build atomic power plants in the heart of the coal region for the purpose of supplying these power requirements, the established price of U-235 should be increased. There is no atomic power plant that could be constructed in the near future that by any reasonable system of accounting would provide power for less than 4 mills. The price is more likely to be 8 to 12 mills. If you double the cost of electric power for production of U-235 you have effectively done away with one of the advantages inherent in atomic energy, that is, the transportability of U-235 from a cheap power area for use in a higher cost area. As I stated earlier, it may be economical for a long period of time in the future to utilize coal-produced electricity in the Ohio Valley to run U-235 plants to produce U-235 for use in producing higher cost but competitive electric power in areas away from the Ohio Valley. It would be a shame to penalize the future of atomic power costs in this country just to win a kilowatt race.

Rather than a costly program for building large-scale plants by the Government, I believe the better procedure for achieving an accelerated program is

to continue and expand the present partnership between free enterprise and the Government. By continuing this partnership it is not necessary nor desirable to exclude public power groups from participating in the program. There is no reason why both public and private utilities cannot continue to participate even though our program is accelerated. In order to advance more rapidly toward an objective of achieving cheaper atomic power, I believe that certain changes and expansions can and should be made within the basic framework of the present program. I would like to discuss some suggestions for accelerating our reactor program for achieving cheaper atomic power.

First, let us continue the present practice of Government support of research and development and the initiation of new types of reactor experiments. With the increase in the number of new organizations in the atomic energy field, more Government money can be utilized at this time to support such research and development and such reactor experiments.

Second, we should continue the Power Reactor Demonstration Program, expanding it to include the prototype development of all types of reactors at such time as reactor experiments develop to the point where a large prototype is feasible. If at any time private enterprise fails to support adequately any promising reactor type, the Government should take the initiative to develop it. Moreover, the Power Reactor Demonstration Program should continue to support both public and privately owned utility groups.

Third, in the Power Reactor Demonstration Program the Government can offer even more liberal assistance in research and development funds as a means of accelerating existing and future programs. Additional research and development money can best be used in support of such items as core development, expediting and perfecting fuel reprocessing methods, and for research and development in the operation of reactors particularly as it applies to remote control maintenance techniques. There are many other such items. Information derived from such Government-supported research and development should, of course, be available to all.

Fourth, lower or even eliminate the interest provisions for U-235 leased to private and public utilities. At the present time the interest rate of 4 per cent is waived for the first five years of operation of an experimental reactor. There is no reason, if acceleration is desired, why this interest rate could not be lowered to the average cost of Government loans or reduced to zero for the full life of any experimental reactor licensed under Section 104 of the Atomic Energy Act. Reducing the 4 per cent interest rate to zero in most reactors will mean a reduction in the cost of power of one half mill or more. This saving, whether given to a public power group or to a private utility, can be passed on equitably to the consumer and it is the easiest way I know of to reduce the cost of atomic power and should make many borderline projects more attractive to sponsors who worry about the increased costs of atomic power on their over-all rate structures. The Atomic Energy Act of 1954 not only would permit lowering the interest rate for Section 104 licensees to zero but would also permit waiving any charge for U-235 burned up or lost in chemical processing. These charges are solely a matter for Atomic Energy Commission determination and could be reduced or eliminated as suggested in the interest of accelerating the program.

Fifth, and perhaps a more controversial issue, would be to raise the price the Government pays for plutonium. This also is within the power of the Atomic Energy Commission. A longer period for the guaranteed price would also be of assistance, but requires Congressional change in the Atomic Energy Act of 1954. Security prevents a full discussion of this issue.

Sixth, in order to encourage and expand the international program, continued steps should be taken to facilitate credit through the Export-Import Bank or other means for the purchase of reactors from the United States. Steps recently taken in this regard should be very helpful. In addition, bilateral

agreements between the United States and nations needing atomic power should be speeded up. Also, it is possible to assist the international program by subsidizing research and development for core developments and other components in a manner similar to the domestic program. The amount of such financial assistance can be kept to a minimum if, initially at least, our effort for international aid be concentrated on those countries that need atomic power because they have an expanding industrial development combined with higher power rates rather than those undeveloped countries where fossil or hydraulic fuels are available but the main reason for the lack of power is the lack of capital. In such cases, financial assistance to develop conventional power makes more sense.

I am confident that these suggestions for acceleration of the atomic power program to achieve cheaper power via the route of continuing an even more aggressive partnership between private enterprise and Government will get faster and more results per taxpayer's dollar than a large Government construction program.

In conclusion, I would like to reiterate that the military program of atomic energy has done much to assist the development of economic atomic power, that atomic power does not mean cheap electricity, that rapid advances have been made and are being made in achieving cheaper atomic power, that the partnership between private enterprise and the Government permitted under the Atomic Energy Act of 1954 has accelerated the power program, and that further acceleration of our power program can best be achieved by continuing and expanding this partnership between free enterprise and the Government and we need not resort to a Government monopoly or a large Government construction program.

Missile Capital

The Nation's automobile capital, Detroit, is well on the way to becoming the Nation's guided missile capital, according to *American Machinist.*

Shortest Railroad Is Just a Car Long

Through the aid of the world's shortest railroad, the Fisher Body Division of General Motors, is now able to study what goes on in standard railroad cars as they rocket around the country.

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Thanks to this first complete laboratory for studying what goes on inside a rail car during transit, Fisher engineers can now design and build loading and packaging aids that assure safer arrival of glass, metal and other components at its assembly plants.

Record '57 Volume

Heavy construction contractors will be awarded a record-volume of new business in 1957, *Construction Methods and Equipment* predicts. The magazine puts next year's contract awards total at $23.2-billion, a figure 10 per cent higher than that registered in 1956. Contractors engaged in work other than building construction are thought to have the brightest prospects. Total awards are expected to climb 22 per cent above 1956 for this broad type of work, which includes highway, bridge, sewerage, dam and airport construction.

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Reviews of Technical Books

Structural Details

Handbook of Standard Structural Details for Buildings, by Milo S. Ketchum, Prentice-Hall, Inc., Englewood Cliffs, N.J. 1956. 120 pages.

The book should be a valuable guide for students, practicing engineers, and architects.

For the author has prepared typical working drawings of the standard details arising in building construction. His purpose is to show how better graphical expression of a designer's ideas may be achieved with the result that drawings are less cluttered by useless detail.

The six representative-type building structures include: a complete house; a masonry building; a reinforced concrete office building; an industrial building; and a timber building. The written text appears on the same page, or across from, each drawing and is an explanation of the use of each detail and the reasons behind each selection. Variations of details and other information concerning detail selection are discussed.

Milo S. Ketchum taught Structural Engineering at Case Institute of Technology, entered the professional engineering field, and is now a partner of the consulting engineering firm, Ketchum and Konkel, in Denver, Colorado.

R.G.G.

Concrete

Composition and Properties of Concrete, by George Earl Troxell and Harmer E. Davis; with chapters on Proportioning of Concrete Mixtures and Strength of Concrete by J. W. Kelly. McGraw-Hill Book Company, Inc., New York 36, N.Y. 1956. 434 pages. Price $7.75.

In this text certain simple principles in the making and utilization of concrete have been developed and set down for the beginning student. It may also serve as a guide to practicing engineers in selecting and using cement, fine aggregate, coarse aggregate, and admixtures for a structure.

Troxell and Davis feel that today, more than ever, a civil engineer is required to give thought and time to the problems involved in the making of concrete and the results depend upon the engineering knowledge of concrete and of the materials from which it is made. Improved methods of testing and inspection are resulting in the control of the qualities of concrete within more well-defined limits.

This book is a combination text and laboratory manual. The laboratory work will enable the student to become familiar with the nature and properties of concrete. By summarizing his work in written form, the student will obtain practice in the formulation of engineering reports. The authors stress the batching, mixing, placing, and curing of the concrete to produce a finished product of suitable and predictable quality and economy.

R.G.G.

Communications

Communication Engineering, by W. L. Everitt and G. E. Anner, McGraw-Hill Book Company, Inc., New York 36, N.Y. 1956. 644 pages. Price $9.00.

This third edition of a text well-known in the communication field, is especially helpful because of its clear, step-by-step analyses of the major problems confronting communication engineers.

The authors, Everitt and Anner, decided to concentrate on the area which must precede the study of all other divisions of communication, that is, the fundamentals of linear-network analysis and synthesis, including the use of unilateral elements. They have also developed both an analysis of various types of modulation and the transformation of transients from the time to the frequency domain.

Valuable additions, to mention but a few, include: a broader treatment of mesh and nodal analysis of general networks; a more general treatment of long lines; low-loss line analysis and synthesis by means of bicircular and Smith charts; the losses in impedance transforming networks; and broadband linear amplifiers.

W. L. Everitt is the dean of the College of Engineering at the University of Illinois and G. E. Anner is associate professor of Electronic Engineering at the same university.

R.G.G.

Electrical Engineering

Pulse and Digital Circuits, by Jacob Millman and Herbert Taub, McGraw-Hill Book Company, Inc., New York 36, N.Y. 1956. 687 pages. Price $12.50.

The purpose of this text for senior and graduate courses is to provide a description and an analysis of the circuits and techniques that are common to the newer fields of electrical engineering.

Millman and Taub state that the original motive for a course in electronics was to provide the student with a background for the understanding of radio communication. Within the past ten years equally important fields have been developed, which require a knowledge of electronic circuits that are often quite different from those found in radio systems. The circuits and techniques described in this text are basic to an understanding of many diversified and specialized fields.

The material presented has been used in classes for over eight years. The principal emphasis is upon a deep theoretical understanding of pulse and digital circuits and techniques. At the same time the authors have included enough practical details to make the text useful in the laboratory. Illustrative examples are worked out and over 400 homework problems are included.

R.G.G.

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Are Machines Growing too Complex?

Machines are becoming so complex that engineers who design them will have to place less emphasis on the output of the machines and pay more attention to making them easier and simpler to operate. This was the prediction of George A. Peters, Jr., engineer at the Picatinny Arsenal, Dover, New Jersey, writing in a recent issue of *Mechanical Engineering*, official publication of The American Society of Mechanical Engineers.

The theme of his article was that machines are growing so complicated that they place a heavy strain on the men who operate them. At the same time, the consequences of an error in operation are becoming more drastic. For example, one man operating an entire automated chemical plant could do tremendous damage and cause financial loss by a single mistake.

As a result, engineers will have to take "a realistic view" of the capabilities and reliability of the workers who will operate tomorrow's production lines, and design machines accordingly.

In the past, the Mechanical Engineering article said, the individual worker was considered the variable which had to adjust to the machine system. Now, however, "the transition of workers' operations from simple manual manipulations toward increasingly complex . . . and decision-making functions has stressed the need for design in terms of human capability and variability." He adds that engineers are being called upon to make even the simple human operations more "natural" for ease of machine operation and for customer sales appeal.

In order to answer questions posed by the need for simplifying machine operation, Peters wrote engineers will have to turn to "the new field of human engineering which draws its basic information from the older fields of psychology, anthropology, sociology, anatomy and physiology."

Basic courses in human engineering should be an integral part of the formal education of all engineers according to Peters. He added that some means of communication should be established between the various groups interested in human engineering. He raised the possibility of forming a special professional organization which would be open to specialists in psychology, engineering, anthropology, physiology, sociology, medicine, mathematics, statistics, physics and anatomy as well as those engaged in the more or less similar applied sciences of biochemists, engineering psychology, biotechnology, applied experimental psychology, psychophysiology, psychotechnology, and ergomanics.

Versatility of Wood Gets New Recognition

A new recognition of wood as a remarkable and versatile material has resulted from "engineered timber construction," it was reported at the 1956 annual meeting of The American Society of Mechanical Engineers on Nov. 29 by J. C. Van Dyke, Unit Structures, Inc., Peshtigo, Wisconsin.

The use of laminated wood and new types of mechanical fasteners have made possible the use of arches and beams of spectacular size, shape, and design, he said. These engineered improvements have been made while keeping these wood products competitive in price, Van Dyke said.

Laminated wood is distinguished from plywood in having the grain of adjacent, adhesive-bonded plys parallel and in having as plys, standard dimension boards one and two inches thick. It is like solid timber except for greater uniformity and stability of its strength properties.

The principal advantages of laminated wood, according to Van Dyke, are, one, almost unlimited size of beams and arches, two, the ability to make judicious use of various grades or combinations of lumber grades so that high-strength lumber is used in high-stress areas and low-strength lumber in low-strength areas, and three, the ability to curve or shape structural members to fit architectural designs. He said, however, that building codes have not kept pace with these engineering developments of the past 20 years.

The most spectacular example of huge laminated wood arches described by Van Dyke is the Jai Alai sports arena at West Palm Beach, Fla., which utilizes the world's largest glued laminated arch, a span of almost 250 feet. These record arches rise to a height of 75 feet and are about 300 feet long. Their width is 11 inches and their depth varies from 25 inches at the base to 46 inches near the quarter points and 20 inches at the crown. They are spaced 16 feet apart and have four rows of longitudinal strut cross bracing.

Arches of a number of churches have been made of laminated wood, and the use of engineered wood for industrial buildings, factories, and warehouses has become extensive. A church in Madison, Wis., has one of the heaviest fabricated wood sections ever made. It has a 7-foot deep structural knee which, with an 8-foot filler block, makes it a full 15 feet thick at its deepest point. This member is 22 inches wide at the base and knee, and tapers in width to 9 inches at the crown.

The nation's largest single-story warehouse, with 25 acres under one roof, has a framework consisting of 765 wood bowstring trusses, each spaced 20 feet apart and spanning 71 feet.

Gains and Losses

Bad gains are true losses.

—Poor Richard's Almanack

WSE Personals

The American Institute of Consulting Engineers has announced at its headquarters in New York that Ralph Budd, MWSE, retired chairman of the Chicago Transit Authority, has received its Award of Merit for 1956. Presentation was made at the annual dinner, November 27, in The Waldorf-Astoria, at which the principal speaker was Harlow H. Curtice, president of General Motors Corp.

The citation states that the Award is to a "distinguished American, outstanding engineer, able administrator, inspiration to young engineers; pioneer in the development of his country through leadership in transcontinental rail and motor transportation."

Budd formerly was president of the Great Northern Railway and the Burlington-Rock Island Railroad.

Budd was introduced by Alfred E. Perlman, president, New York Central Railroad. Curtice was introduced by Charles F. Kettering, director and research consultant, General Motors Corp.

Previous recipients of the Award have been Clarence D. Howe, 1952; Vannevar Bush, 1953; former President Herbert Hoover, HMWSE, 1954; Benjamin F. Fairless, 1955.

* * *

John E. McGrath, director of the transportation programs at the American University, Washington, D. C., has been appointed assistant director of of education for the new Transportation Center at Northwestern University.

He will assume the post Jan. 1.

McGrath will assist in the employment of a broad educational program in transportation at the University and in planning and supervising short courses, seminars, and symposia in the transportation field.

Formerly a teaching associate in transportation at the Indiana University school of business and an instructor in transportation at the University of Missouri school of business, McGrath has been on the American University faculty since 1955. He holds two degrees from the University of Chicago, where he majored in transportation, and a doctorate in business administration from Indiana University.

The Northwestern Transportation Center opened this fall. It provides education, basic research, and service to the transportation industry and the nation.

Fred G. Gurley, president of the Atchison, Topeka and Santa Fe Railway company, is chairman of the center's 23-man advisory committee, composed of leaders in all fields of transportation. Director of the center is Franklin M. Kreml. Kreml is on leave from the internationally-known Northwestern Traffic Institute.

In addition to providing research and consultative services to the transportation industry, the center offers undergraduate courses, studies at the graduate level leading to a master's degree, and special courses for executives in the transportation field.

* * *

Guy F. Atkinson of San Francisco and Louis R. Perini of Framingham, Mass. on Nov. 7 were named as the 1957 recipients of the awards given annually by The Moles for "outstanding achievement in construction."

The announcement was made at a dinner meeting of The Moles, a society of leading figures in the tunneling and heavy-construction industry, at The Biltmore. Formal presentation of the honors will be at the annual Moles Awards dinner at the Waldorf-Astoria hotel next February 7. Atkinson and Perini make up the 17th pair of honorees in a series that started in 1941 and numbers among its winners former President Herbert Hoover, HMWSE, Robert Moses, Admiral Ben Moreell, the late Gen. Brehon B. Somervel, Peter Kiewit, Harvey Slocum and Thomas J. Walsh.

The award is considered the highest recognition that can be accorded service to the American construction industry. It is made annually to one member of the society and one non-member. Perini is the member winner. Announcement of the selections was made by Harry T. Immerman, chairman of the Awards committee.

Perini is president of B. Perini & Sons, a company that has figured in many of the largest tunnel and dam jobs in the East in the past 20 years. He is also president of the Milwaukee Braves baseball team, having, with his brothers Joseph and Charles, purchased the club in 1945 when it was a Boston franchise. He is a past president of the New England Road Builders Association.

Atkinson, 81 years old, is attending the Olympic games in Australia. He is board chairman of the Guy F. Atkinson Company, which has performed more than 100 major contracts in the country and overseas, among them Grand Coulee Dam, Treasure Island for the San Francisco World's Fair, McNary Dam and

Powerhouse, and the Hanford, Wash., atomic energy plants. He is a past president of the National Associated General Contractors.

* * *

Morris D. Hooven, who is a former president of the American Institute of Electrical Engineers, on October 25 was elected president of the Engineers Council for Professional Development at the 24th annual meeting of that group in the Engineering Society of Detroit Building.

The Engineers Council for Professional Development is the recognized accrediting body for engineering curricula throughout the country.

Hooven, an engineering executive with the Public Service Electric and Gas Company, Newark, N. J., has been active in the affairs of E.C.P.D. for many years. He served as the 1955-56 president of AIEE and is now serving on the Board of Directors as junior past president.

A 1920 graduate of Bucknell University, with a bachelor of science degree, magna cum laude, Hooven was an engineer for Westinghouse Electric and Manufacturing Company (now Westinghouse Electric Corp.) until he joined Public Service in 1922.

* * *

Anderson & Litwack Company has announced the moving of their plant and offices to new and larger facilities at 530-544 Hyde Park ave., Hillside, Ill. The new telephone numbers are AUstin 7-3998, AUstin 7-3999, and LInden 4-4020.

* * *

James H. Towle, MWSE, has announced that he and his associates have formed an organization for the purpose of recruiting technical personnel for the subcontracting field. The new organization is endeavoring to place all types and grades of personnel at no charge to the person in question. All the positions pay a per diem living allowance or travel allowance in addition to the usual company benefits.

* * *

G & W Electric Specialty Company has announced that it has moved into new quarters at 3500 West 127th st., Blue Island, Ill. New telephone numbers are FUlton 8-5010 and INterocean 8-5255.

* * *

At the request of the government of Burma an eminent tool engineering specialist has just been assigned by the United Nations Technical Assistance Administration to help in the development of Burma's manufacturing industry. He is William M. Ramlow of Decatur, Ill.

This is a direct tribute to American leadership in mass-production methods. Every country's standard of living is basically dependent on its manufacturing and production facilities and its ability to make more and better goods available at lower prices.

Ramlow, a senior member of the American Society of Tool Engineers, 35,000-member professional society, has been asked by Burma to use his tool engineering knowledge to assist in the design, development and selection of tools and equipment for the production of industrial and consumer goods suitable to the diversification of the Burmese economy.

Ramlow has held many executive engineering positions in the defense, automotive and aircraft industries. Most recently, he was affiliated with Macon Arms, Inc., manufacturers of projectiles and bombs in Decatur, as plant engineer. He is also a consultant of the Bomb Committee, American Ordnance Assoc. and has authored articles for The United Nations Review and collaborated on Reports for the NATO Conferences.

He holds degrees in both Mechanical Engineering and Business and Public Administration from the University of Missouri.

* * *

Twelve industrial and governmental leaders have agreed to serve on an advisory committee for the 1957 National Industrial Research Conference.

The conference, sponsored by Armour Research Foundation of Illinois Institute of Technology, will be held April 24 and 25 at the Conrad Hilton Hotel in Chicago.

The committee will aid the Foundation in planning the conference program, according to C. E. Barthel Jr., conference chairman and assistant director of ARF.

The conference will have "Research for Profit" as its theme and will deal with such subjects as sales growth through research, research efficiency, and off-shoot gains from research.

The advisory committee includes:

Robert C. Becherer, president, Link-Belt Co., Chicago; Herbert P. Buetow, president, Minnesota Mining and Manufacturing Co., St. Paul, Minn.; James D. Cunningham, MWSE, president, Republic Flow Meters Co., Chicago; John F. P. Farrar, president, Flexonics Corp., Maywood, Ill.;

Dr. C. C. Furnas, Assistant Secretary of Defense, Washington, D. C.; T. V. Houser, chairman of the board, Sears, Roebuck and Co., Chicago; Charles C. Jarchow, president, American Steel Foundries, Chicago; Dr. Mervin J. Kelly, president, Bell Telephone Laboratories, New York City;

Maj. Gen. Leslie E. Simon, director, research and development, The Carborundum Co., Niagara Falls, N. Y.; Col. John Slezak, MWSE, chairman of the board, Kable Printing Co., Mt. Morris, Ill.; Solomon B. Smith, executive vice president, The Northern Trust Co., Chicago; and Winthrop H. Smith, directing partner, Merrill Lynch, Pierce, Fenner and Beane, New York City.

WSE Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc. All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

20-56 W. J. Daly, Vice President, Appraisal Engineering Corp., 3655 N. Ashland Av.

21-56 Richard A. Gillespie, Application Engineer, Clark Controller Co., Box 68, Brookfield, Ill.

22-56 William J. Bauer, Project Engineer, John F. Meissner, Engineers, 308 W. Washington St.

23-56 Imre Szuets, Civil Engineer (Design Computer), Harza Engineering Co., 400 W. Madison St.

24-56 Clyde N. Baker, Jr., Soil Engineer, Soil Testing Services, Inc., 3521 N. Cicero Av.

25-56 Charles W. Greeley, Civil Engineer, City of Chicago, 320 N. Clark St.

26-56 James E. Erskine, Application Engineer, S & C Electric Co., 4435 N. Ravenswood Av.

27-56 Jan Blokland, Supervising Engineer, S & C Electric Co., 4435 N. Ravenswood Av.

28-56 James A. Zurbrigen, Chief Engineer, Chemject Div., Soil Testing Services, Inc., 3521 N. Cicero Av.

29-56 Calvin E. Smith, Sales Representative, American Brake Shoe Co., 155 N. Wacker Dr.

30-56 Eugene C. Kennedy, Engineer, A. J. Boynton & Company, 111 N. Wabash Av.

31-56 Charles A. Morton, Service Engineer, West Virginia Pulp & Paper Co., 35 E. Wacker Dr.

32-56 R. Wohlwend, Sales Engineer, Combustion Engineering, Inc., 105 W. Adams St.

33-56 Richard J. Bailey, Project Mgr., High Pressure Air, Cardox Corporation, 307 N. Michigan Av.

34-56 Andrew B. Lytle, Dist. Mgr. & Sec.-Treas., John F. Beasley Construction Co., 20 N. Wacker Dr.

35-56 Edward F. Sullivan, President, M. J. Corboy Corporation, 405 N. Desplaines St.

36-56 Jack H. Bornhoeft, Vice President, Gerhardt F. Meyne Co., 308 W. Washington St.

37-56 Robert A. MacDonald, Design Engineer, Laramore & Douglass, Inc., 332 S. Michigan Av.

38-56 Sidney I. Cole, President, The Industrial Erectors, Inc., 1316 W. Cermak Rd.

39-56 William Levinsky, President, Crest Engineering Company, 343 S. Dearborn St.

40-56 John F. Endres, Sr. Application Engineer, S & C Electric Company, 4435 Ravenswood Av.

41-56 Richard W. Kress, Assist. Maintenance Engr., Illinois State Toll Highway Commission, 20 N. Wacker Dr.

42-56 Ralph A. Michael, Dist. Operating Supt., Northern Illinois Gas Company, 170 N. Ottawa St., Joliet, Ill.

43-56 Kenneth F. Gerleman, Consulting Engineer, Clay Products Association, 100 N. LaSalle St.

44-56 M. M. York, Mgr.-North Central Region, Allis-Chalmers Mfg. Co., 135 S. LaSalle St.

45-56 Ronald J. Baschiere, Co-op. Student, Armour Research Foundation, 10 W. 35th St.

Ultrasonic Generator Fights Birds and Fires

Birds nesting on the edges of airport runways have caused a number of jet plane accidents by being sucked into the jets' air intake, reports *American Machinist*. The cure, or so it was thought: a high power, ultrasonic generator mounted on a truck that was driven down the runways. It was believed that the sound would scare away the birds. After their initial surprise, however, the birds took no notice of the noise. But the experiment wasn't wasted; it was discovered that the sound waves possessed unusual ability to snuff out fires when bounced off a wall or other surfaces. Such sound trucks may be used in the protection of oil-tank fields from fire.

Pain vs Pleasure

The honest man takes paines, and then enjoys pleasures; the knave takes pleasure, and then suffers pains.

—Poor Richard's Almanack

Nature Plays Rough on The St. Lawrence

Nature is roughing up construction companies at work on one of the world's most enterprising construction jobs — the St. Lawrence Seaway-Power projects.

At least two companies already have given up their assignments and gone home, turned back by some of the most difficult earthmoving conditions ever faced. Others have ended their work with slim pocketbooks. If nothing else, the St. Lawrence projects are emphasizing to construction companies the need for preventive maintenance of equipment, reports *Construction Methods and Equipment.* Most of the big companies are using well over $1 million of equipment, and top-flight maintenance habits are of the utmost importance to those that hope to turn a profit, the magazine said.

Opening the St. Lawrence River to ocean-going shipping and harnessing the river's energy for hydroelectric power is an immense excavating and dredging project. If all the earth that is being removed from the International Rapids section of the river were dumped into railroad gondolas, they would circle the globe at the equator.

One of the most formidable obstacles facing contractors harks back to the Ice Age. The Great Glacier packed the St. Lawrence valley with "till," a mixture of silt, soil and rock with the density of concrete. Over that lies another digger's dismay, a thick layer of blue marine clay—wet, sticky and hard to move. To make things worse, it is difficult to estimate where the clay ends and glacial till begins.

A trail of broken drive lines and damaged transmissions, shovels and work engines has plagued contractors. Because the maintenance of equipment has proven an immense undertaking, rigid preventive programs and well-equipped repair shops have been established by most contractors.

The most vital phases of the respective maintenance programs are the weekly and monthly check systems. Each piece of equipment gets a quick inspection each week, a thorough one each month. Weekly inspections are done at the job.

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New Swedish Method Keeps Lanes Ice-free

After a few years of practical use and testing the new Swedish method of keeping shipping lanes ice-free in winter time seems to be ripe for a more large-scale application of the system. The City of Vasteras, home of the ASEA Company and other large industries, situated on Lake Malar is now studying a project for linking its port with Sodertalje on the Baltic—a distance of some 60 miles —by means of compressor-fed perforated plastic tubes placed at the bottom of the lake. The compressed air whirls the warmer bottom water towards the surface and melts the ice, at the same time preventing further ice formation.

Preliminary calculations indicate that the project would be a paying proposition, eliminating costly ice-breaking and facilitating the speedy turnover of goods, thereby also effecting savings in storage space.

Traffic in Lake Malar, one of Sweden's many extensive inland water courses, has hitherto been greatly hampered by the protracted and heavy ice formation in winter. The lake is deep and relatively free from water currents, and would thus be well suited for an installation of the new type, invented and perfected by the Atlas Copco firm in collaboration with AB Svenska Metallverken, who have developed the special type of neoprene tubes used.

After a couple of years of successful use in ferry lanes, at shipyards, and timber sorting stations, etc., an experimental plant was tried out the winter of 1955-56 in the Port of Vasteras by a group of collaborating firms and shipping experts. This plant consisted of 1,000 feet of plastic tubes perforated by pinprick holes bored at a distance of 33 feet from each other in the main part, and 16 feet from each other at the part farthest from the compressor station. The compressor had a capacity of 450 l/min. (100 imp. gal. per min.). The water depth was about 50 feet.

When the plastic tube was being laid out the ice had a thickness of about 2 feet. After about 20 hours, open ice-holes started to appear and 24 hours later holes of 30-foot width had formed, leaving a practically free lane of water. 30-40 feet wide. After the plant had worked for about two weeks, the lane had reached a width of 60-65 feet. As long as air was being fed, the lane remained open, but a layer of ice was formed as soon as the supply of air was discontinued. The unusually severe winter last year made it evident that the method was reliable even during very heavy cold spells, and it appeared that even as little as one-half of the compressor capacity used would be sufficient for identical conditions.

ASCE Announces New Pipeline Division

In recognition of the rapid and extensive developments of the pipeline industry and the wide activity of many of its members in that field, the American Society of Civil Engineers has announced the creation of the Pipeline Division. This 14th division of the Society, heretofore the Pipeline Committee of the Construction Division, now is a going concern following formal inauguration ceremonies at the Society's national convention in Pittsburgh, Oct. 17.

The Pipeline Committee had been increasingly active in Society affairs, presenting six technical papers at two Pittsburgh sessions. Its first technical papers as a Division will be presented Feb. 19 and 20, 1957, at the Society's convention in Jackson, Miss.

In announcing the Division's plans, Chairman Hunt said: "Many civil engineers are in the pipeline industry, which cuts across most phases of engineering represented by the Society. The Division is in the organization in which we 'pipeliners' can, most effectively, coordinate our work and technical progress with other fields of engineering.

"The Division's purpose is to advance and correlate scientific knowledge and promote and coordinate economic development and construction of engineering projects in connection with the transmission of liquids, gases or solids by means of engineering in the fields of surveying and line location, design, construction and operations, and to promote and further the mutual utilization of the established codes for pressure piping as among pipeline, highway and railroad groups and public authorities."

The following committees will be organized:

Advisory; publications; session programs; membership; public relations; cooperation with local sections; fluid dynamics; pipeline crossings of railroads and highways; pipeline location, surveying and mapping; pipeline design, specifications and operating standards; pumping and compressor stations; storage of pipeline fluids.

Protective Suit Withstands High Heat

A protective suit designed for use in fighting fire and in repair of hot equipment has been demonstrated in a 1200-degree Fahrenheit furnace, reports *Petroleum Processing*. To dramatize the intense heat against which the suit gives protection, an engineer walked into the furnace carrying sticks of wood. The sticks burst into flames. The suit, made of a fiber glass material coated with aluminum and backed up with fiber glass quilting, reflects nine-tenths of the heat. The little heat that gets through is dissipated by the layer of quilting.

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Engineering news from Commonwealth Edison

corrosion

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Corrosion, with all the physical laws and time itself on its side, is the constant enemy of all industry. In the fight to keep our materials from returning to their original state, we are much like farmers fighting weeds. We can never hope to completely eliminate corrosion . . . but we must keep it to a tolerable minimum to maintain good service at low cost.

To Commonwealth Edison Engineers this is a particularly important and pressing problem. More than 6500 miles of cable, 250 miles of armored submarine and trench-lay cable, and twenty-nine miles of pipe-type cable represent a tremendous investment.

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